DECLARATION UNDER 37 C.F.R. §1.131

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

We, Anuj Chauhan, Ph.D. and Derya Gulsen, Ph.D. do hereby make the following declaration:

1) Anuj Chauhan, Ph.D. is currently a Professor in the department of chemical engineering at the University of Florida. Before joining the University of Florida, Anuj Chauhan conducted post doctoral research at the University of California at Berkeley and obtained the undergraduate degree in chemical engineering in 1993 from Indian institute of Technology in Delhi, India, which is arguably the most prestigious school in India. Anuj Chauhan obtained the doctoral degree in chemical engineering from the City University of New York in 1998. Most of Dr. Chauhan's research focuses on fluid mechanics and interfacial phenomena in biomedical systems. He has published more than 60 papers and presented more than sixty papers at various national and international conferences. His research has been cited both in peer reviewed journals and in popular press including Readers Digest, Discover, CNN Headline News, etc. The research on ophthalmic drug delivery by contact lenses was cited as a Medical Breakthrough of the year by Readers Digest. Dr. Chauhan reviews papers for the most prestigious journals such as the Journal of Fluid Mechanics, Physics of Fluids, Langmuir, Journal of Colloids and Interface Science, etc., and organize sessions and symposiums at some of the most prestigious national conferences in chemical engineering such as the AIChE and the ACS conferences. Dr. Chauhan's research focuses on the areas of fundamental as well as societal impact, such as drug delivery, drug detoxification, DNA separation, etc. and his research is being supported by

various companies as well as the federal agencies such as NSF, NIH and NASA. Derya Gulsen, Ph.D. joined the doctoral program in chemical engineering at the University of Florida in Fall 2000. She joined the research group of Dr. Anuj Chauhan and began doing research on her PhD project in January 2001 after Dr. Chauhan joined the department.

2) The Examiner has rejected claims under 35 USC 103 as being unpatentable over Resnick in view of other references [US 2002/0141760], (hereinafter Resnick).

3) Resnick was filed on March 29, 2001; published on October 3, 2002; and abandoned on May 17, 2004 for failure to respond to office action.

4) Attachments A, B and C will show that I (Anuj Chauhan) conceived the present invention prior to Resnick. I was diligent in reducing the invention to practice immediately after I joined the University of Florida on January 4 2001. In the first year after joining the UF, I was focusing my entire research efforts solely on reducing my conceived invention of delivering ophthalmic drugs by contact lenses and so I was spending at least 40 hours each week in various aspects of the project. I (Anuj Chauhan) also chose a graduate student Derya Gulsen to assist me in reducing my conceived invention to practice. Derya Gulsen joined the doctoral program in chemical engineering at the University of Florida in Fall 2000. She joined my research group and began doing research on her PhD project in January 2001. Derya Gulsen's thesis is titled "Ophthalmic drug delivery through nanoparticle-laden soft contact lenses". As a PhD researcher she was conducting at least 40 hours of research each week on her project since January 2001. She began the project by preparing hydroxyl ethyl methacrylate (HEMA) gels and also by developing microemulsion formulations. She then proceeded to load microemulsions in the gels. She conducted a series of experiments with various formulations of the microemulsions and various formulations for the polymerization mixture. She finally determined the compositions and the methods to prepare transparent HEMA gels loaded with microemulsions. She

then proceeded to load a hydrophobic oil form of drug lidocaine into the microemulsions. Finally she measured the drug release rates from the lenses and demonstrated extended drug release capacity from the microemulsion loaded contact lenses, with drug encapsulated in the microemulsions. The sequence of steps described above took about 9 months and thus the invention was reduced to practice in October 2001. There was however continued diligence in reducing the invention to practice starting January 2001.

5) Attachment A provides a document originally provided to University of Florida as part of the application process for a position as an Assistant Professor in the department of chemical engineering. Based upon my computer records this document was last modified on February 3, 2000 at 5:49:26 AM. The document was submitted to University of Florida approximately mid-February, 2000. Thus, this document pre-dates the March 29, 2001 filing date of Resnick.

6) Attachment B provides a copy of a document distributed to graduate students at the University of Florida. The document was used in selecting the students that assisted with the research. Based upon my computer records this document was last modified on Friday, October 20, 2000, 3:35:06 PM. Thus, this document pre-dates the March 29, 2001 filing date of Resnick.

7) Attachment C is the invention disclosure that was submitted to the University of Florida Office of Technology Licensing. The document was submitted on October 23, 2001 and received October 29, 2001. This document provides further evidence of continued diligence related to this invention.

We further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated: November 9, 2011

By: _____

Anuj Chauhan, Ph.D.

By: _____

Derya Guisen, Ph.D.

Attachment A

26 Crystal Way,
Berkeley CA 94708
Anuj@radke.chem.berkeley.edu
http://www.cchem.berkeley.edu/~cjrgrp/Anuj/anuj.html

Home 510-524-0673
Office 510-642-0853
Fax 510-642-4778

Anuj Chauhan

OBJECTIVE

A challenging teaching and research career with emphasis interfacial phenomenon, fluid mechanics and bio-medical engineering.

EDUCATION

Ph.D. in Chemical Engineering 8/93-4/98
Levich Institute and the Department of Chemical Engineering,
The City College of the City University of New York.
GPA: 4.0/4.0

B.Tech in Chemical Engineering 8/89-5/93
Indian Institute of Technology, Delhi, India.
GPA: 8.51/10.0

PROFESSIONAL EXPERIENCE

Post-Doctorate
Department of Chemical Engineering and School of Optometry, University of California at Berkeley 5/98-present

- Developed a mixing model for enhancing the mixing in Post Lens Tear Films.
- Developed a model for contact lens dynamics under the effect of eyelid forces.
- Modeled surfactant-driven spreading of aqueous drops on organic liquid substrates.

Research Associate
Chemical Engineering Dept., City College of the City University of New York 09/93-4/98

- Doctoral Thesis: '*Capillary Instability of a Compound Jet*'
- Analyzed the Temporal, Spatial and Absolute Instability of an inviscid and a viscous Compound Jet.
- Controlled the breakup size and length of two-phase fluid jets.
- Experimentally verified the Convective and the Absolute Instability of a Single Jet.
- Designed a setup to produce fixed size drops through capillary breakup of a jet.

Instructor
School of Engineering, City College of the City University of New York 09/94-4/98

- Engr 101 : Freshman Design- Bridge Design and Robotics Modules
- Engr 102: Design of a Distillation Column for separation of Water-Acetic Acid Solution.
- Teaching Assistant for Transport I – Fluid Mechanics.

Undergraduate Research
Chemical Engineering Dept., Indian Institute of Technology, Delhi, India 08/89-05/93

- Developed software for the optimal control of Chemical Engineering Processes.
- Design of foam-bed reactor for heterogeneous gas-liquid reactions.
- Analyzed the multiplicity of steady states for a non-isothermal reaction in a foam-bed reactor.

AWARDS

- Robert E. Gilleece Fellowship award from the City University of New York. (9/93-8/97)
- Dissertation Year Fellowship from the City University of New York. (9/97-4/98)
- Second Prize in the technical paper competition conducted at the national (India) level : TRYST 1992

AFFILIATIONS

- American Institute of Chemical Engineers (AIChE).
- The Association for Research in Vision and Ophthalmology (ARVO).

EXTRA CURRICULAR ACTIVITIES

- Member of the Graduate Council of The City University of New York.
- Member of the Organization Committee of TRYST' 93: A national (India) level technical paper competition.

PUBLICATIONS

- Chauhan, A; Maldarelli, C; Rumschitzki, DS; Papageorgiou, DT., 'Temporal and spatial instability of an inviscid compound jet'. Rheologica Acta, 1996 Nov-Dec, V35 N6: 567-583.
- Chauhan, Maldarelli, Papageorgiou and Rumschitzki, 'The linear stability of a two-phase compound jet: Temporal, spatial and absolute stability of viscous and inviscid compound jets', in IUTAM Symposium on Non-linear singularities in deformation and flow, 271-282D. Durban and J.R.A. Pearson, Eds, Kluwer Academic Publishers, Dordrecht, The Netherlands, 1999.
- Chauhan, Maldarelli, Papageorgiou and Rumschitzki, 'Temporal Stability of a Viscous Compound Jet', accepted for publication in the Journal of Fluid Mechanics.
- Chauhan, Radke, Svitova, 'Modeling of aqueous DDAB solution spreading on mineral oil', accepted for publication in JCIS.
- Chauhan, Maldarelli, Papageorgiou and Rumschitzki, 'Absolute Instability of an Inviscid Compound Jet', Submitted for review to The Phys. Of Fluids.
- Chauhan, Rumschitzki, Papageorgiou and Maldarelli, 'Experimental Investigations of Single Jet Instability', to be submitted to The Journal of Fluid Mechanics.
- Chauhan, Maldarelli, Papageorgiou and Rumschitzki, 'Capillary Instability of a Viscous Compound Jet', to be submitted to The Journal of Fluid Mechanics.

PRESENTATIONS

- Chauhan, Maldarelli, Papageorgiou and Rumschitzki, 'Temporal, Convective and Absolute Instability of an Inviscid Compound Jet', Annual Meeting of the AIChE, Miami, November, 95.
- Chauhan, Maldarelli, Papageorgiou and Rumschitzki, 'Spatial Instability of a viscous Compound Jet', Annual Meeting of the AIChE, Chicago, November, 96.
- Chauhan, Maldarelli, Papageorgiou and Rumschitzki, 'Experimental Investigations of Single Jet Instability', Annual Meeting of the AIChE, Los Angeles, November, 97.
- Chauhan, Maldarelli, Papageorgiou and Rumschitzki, 'Experimental Manifestation of Absolute Instability in a Single Jet', Annual Meeting of AIChE, Miami, November, 98.
- Chauhan, Radke and Polse, 'Modeling of contact lens dynamics', a presentation made to the research groups of Ciba Vision and Bausch & Lomb, San Francisco, December, 98.
- Chauhan, Miller, Radke and Polse, 'Mechanism of Black line formation in human subjects', ARVO, Ft. Lauderdale, May, 99.
- Radke, Svitova and Chauhan, 'The dynamics of aqueous surfactant solutions spreading over liquid hydrophobic substrates', Amphiphiles at Interfaces, Beijing, China, May, 99.
- Chauhan, Svitova and Radke, 'The Dynamics of Aqueous Surfactant Solution Spreading Over Liquid Hydrophobic Substrates: Experiment and Theory', 73rd ACS Colloid and Surface Science Symposium, Boston, June, 99.
- Chauhan, Maldarelli, Papageorgiou and Rumschitzki, 'Absolute instability in a single jet', presented at the poster session at IUTAM Symposium on Nonlinear Wave Behavior in Multi-Phase Flow, South Bent, July, 99.

- Chauhan, Radke and Polse, 'Motion of soft contact lens', Annual ISCLR conference, Phuket, Thailand, August, 99.
- Chauhan and Radke, 'Surfactant driven spreading on hydrophobic surfaces', Annual Meeting of AIChE, Dallas, November, 99.

RESEARCH REFERENCES

- Professor **Andreas Acrivos**
  Director, Levich Institute for Physico-
  chemical hydrodynamics
  City College of New York
  Convent Avenue and 140th Street
  NY, NY 10031
  Phone: 212-650-8157
  acrivos@scisun.sci.ccny.cuny.edu

- Professor **Clayton Radke**
  Department of Chemical Engineering
  University of California at Berkeley
  Berkeley, CA 94720
  Phone: 510-642-5204
  radke@cchem.berkeley.edu

- Professor **Charles Maldarelli**
  Levich Institute for Physico-chemical
  Hydrodynamics,
  City College of New York
  Convent Avenue and 140th Street
  NY, NY 10031
  Phone: 212-650-8160

charles@chemail.engr.ccny.cuny.edu

- Professor **David Rumschitzki**
  Dept. of Chemical Engineering
  City College of New York
  Convent Avenue and 140th Street
  NY, NY 10031
  Phone: 212-650-5430

david@ches5s0.engr.ccny.cuny.edu

- Professor **Kenneth Polse**
  525 Minor Hall
  Morton D Sarver School of Optometry
  University of California at Berkeley
  Berkeley 94720
  Phone: 510-642-7745
  polse@socrates.berkeley.edu

- Professor **Demetrios Papageorgiou**
  Department of Mathematical Sciences
  New Jersey Institute of Technology
  University Heights
  Newark, NJ 07102-1982
  Department of Applied Mathematics
  Phone: 973-596-5837
  depapa@aphrodite.njit.edu

TEACHING REFERENCES

- Professor **Benjamin Liaw**
  Director, ECSEL Program
  Department of Mechanical department
  City College of New York
  Convent Avenue and 140th Street
  NY, NY 10031.
  Phone: 212-650-5204
  liaw@me-mail.engr.ccny.cuny.edu

- Professor **Peter Ganatos**
  Department of Mechanical department
  City College of New York
  Convent Avenue and 140th Street
  NY, NY 10031.
  Phone: 212-650-5215
  ganatos@me-mail.engr.ccny.cuny.edu

RESEARCH INTERESTS AND FUTURE RESEARCH

(1) BIOMATERIALS STUDIES

CONTACT LENS DESIGN

Our research efforts in this field are directed towards developing an extended wear soft contact lens. Currently, the extended wear of soft contact lens is known to significantly increase the risk of bacterial infection to the cornea. We believe that this enhanced risk is due to a lack of good mixing between the tear film (Post Lens Tear Film-POLTF) sandwiched between the cornea and the lens and the tear meniscus. Due to lack of mixing, bacteria and cell debris gets trapped in the POLTF. In addition, the small flow in the POLTF results in small shear on the corneal surface, and so it is much easier for the bacteria to attach themselves to the corneal surface.

The aim of this multi-faceted project is to develop a fundamental model to analyze the behavior of the contact lens in the eye and to ultimately develop better designs to alleviate problems of corneal infection. Our strategy to avoid such infections is to enhance the mixing between the thin tear layer (the Pre Ocular Tear Film (POTF)) sandwiched in between the cornea and the lens, and the tear lake outside the lens.

CURRENT RESEARCH

This is a long-term project and Professor Kenneth Polse of the School of Optometry at UCB, Professor Clay Radke, some graduate students and I have been working on it.

The first stage of the project deals with developing a fluid mechanical model to understand the mechanism of the tear mixing and to quantify and predict this mixing. Tear film mixing is driven by the periodic squeezing and releasing of the contact lens by the action of the eye-lid (1,2), that drives a periodic couette and squeeze flow in the POLTF. This periodic flow increases the effective dispersivity of a solute (such as a bacterium) present in the tear film, as in the classical Taylor Dispersion problem. We experimentally measure the parameters that quantify these flows.

The second stage of the project deals with understanding the dynamics of the contact lens' deformation because both the motion and the deformation of the lens control the mixing. The non-deforming lens' squeeze-and-release-generated couette and squeeze flows calculated in the first stage are approximate representations of the actual flow patterns. Also, the experimentally determined parameters that characterize these flows depend simply on the lens' mechanical properties, the eye's geometry and the forces that the eyelid exerts (3). Thus, in the second stage we endeavor to develop a model to calculate these flows more accurately. In addition, this model will include all the lens' mechanical parameters (Young's modulus, Poisson ratio) and can be utilized as a design tool to optimize the mixing. The model couples the deformation of the lens with the fluid flow in the POLTF. The POLTF fluid flow is solved using the lubrication approximation. The lens is modeled as a thin, two-dimensional elastic and incompressible membrane. The resulting pde's are solved by finite difference. The shape of the lens changes as it moves during the blink under the influence of the eyelid forces. This stores strain energy in the lens, which causes it to reflex towards its un-deformed state in the inter-blink period (4,5).

At each of the stages of this work, theoretical predictions are tested by performing experiments on human volunteers. The experiments are done in conjunction with the School of Optometry at UC Berkeley. In these experiments a fluorescent dye is introduced into the POTF and the intensity of the fluorescence is measured as a function of time. The rate of the decay of the intensity is directly related to the degree of mixing (2). Other experiments involve measuring POTF thickness and relating it to lens properties, measuring the lens deformation (4) and movement (2) and comparing it to model predictions.

Some of the side issues involved in the problem are studying the dynamics of the tear film in the absence of a contact lens. The important issues are the tear deposition profile; drainage during the inter-blink period;, and tear-film-breakup over the cornea, which may lead to dry-eye syndrome. A graduate student working partially under my supervision is studying some of these issues.

FUTURE WORK

An alternate approach that I want explore to develop extended wear soft contact lens is to laden the lens with anti-bacterial agents that will prevent the growth of bacteria in the POLTF. I have thought of two different and completely new approaches to accomplish this objective:

(1) Attach lysosomes to the posterior lens surface through a tether so that the lysosomes are floating in the POLTF. Lysosomes are the natural enzymes that protect the body against bacterial invasion. Thus, these lysosomes could destroy the bacteria that enter the POLTF and hence prevent infection. The major challenge in this area would be to develop the chemistry to modify the surface of the lens without affecting the vision.

(2) Disperse hollow PMMA spheres containing a solution of anti-bacterial agents such as lysosomes inside the lens. The soft contact lens is made up of hydrogels with 20-70 % water content. Thus, the anti-bacterial agents will diffuse out of the spheres and through the lens to reach the POLTF preventing bacterial infections. The hollow spheres could have holes in them to control the release of the drug. In addition to anti-bacterial drugs, these PMMA spheres could contain drugs to fight dry-eye problems. The major challenge in this area would be to disperse the drug delivery vehicles without affecting the vision and to be able to turn on the drug delivery mechanism just before the lens insertion.

These lenses would be extended wear disposable lenses, i.e., the lens would be worn just once and for a period of about a week. If this idea is successful one could potentially design such lenses with enough drugs to last for a longer period of time. There is a huge demand for extended wear lenses because contact lens manufactures believe that if they can come up with such lenses many more people who prefer to wear spectacles would shift to these lenses because of ease of use. In addition, most companies want to develop a disposable lens to maximize the sales. So, an extended wear disposable lens is bound to be a success.

Another problem associated with the use of soft contact lenses is corneal abrasion, which also increase the risk of bacterial infections. The interaction of the contact lens with the corneal surface results in corneal legions (abrasions), which reduce the barrier resistance of the epithelial cells, making it easier for the bacteria to migrate into the epithelial tissue. Abrasions are a result of direct contact between the cornea and the lens. Designing lenses that maintain the desired POLTF thickness can eliminate corneal abrasions.

It would be my approach to use the fundamental fluid-solid mechanics model discussed above to predict the behavior of the contact lens in the eye to help solve the problem of corneal abrasions. The task would be to use the simulations to predict the effect of the design variables (lens' shape and material) on POLTF thickness and thus to determine the designs that increase POTF thickness and eliminate corneal abrasions.

Ciba Vision and Bausch & Lomb provide the current funding for this project. I believe there is enough scope in this project for me to start an independent research group upon joining a new university. It would an added advantage if I could collaborate with the school of optometry in the new university; otherwise I could continue my collaboration with the School of Optometry at the University of California at Berkeley.

POSSIBLE FUNDING SOURCES: Contact lens companies such as Ciba Vision, Bausch & Lomb, Ocular Science.

(2) INTERFACIAL MECHANICS

SURFACTANT-DRIVEN SPREADING ON HYDROPHOBIC SURFACES

The spreading of a liquid on a second, immiscible liquid has considerable application in environmental, chemical, petroleum, and biotechnology. Accordingly, numerous studies, both experimental and theoretical, are available, primarily for pure spreading liquids (6-15). Spreading of surfactant drops has also received attention due to the interest in the spreading of the inhaled droplets on the lung's liquid lining (16,17). However, the topic of aqueous surfactant solutions spreading on immiscible organic substrates has been pursued only minimally (18,19). This project seeks to develop an understanding of the mechanism of the surfactant-driven spreading of aqueous solutions on thick, hydrophobic substrates.

CURRENT RESEARCH

Spreading on liquid organic substrates: At low concentrations, the rate limiting step in the spreading of aqueous surfactant solutions on liquid organic substrates is the mass transfer of the surfactant to the interface that lowers the interfacial tensions and creates the tension gradients that drive the spreading (20,21). We model the mass transfer and solve the convection-diffusion equation to calculate the surfactant flux and relate it to the spreading rate. Our theoretical results agree well with experimental results of DDAB solution spreading on mineral oil. Further work involves incorporating surfactant dissolution into the substrate so that the model can be extended to surfactants that are somewhat soluble in the substrate liquid as well.

FUTURE WORK

Spreading on Hydrophobic Solid Surfaces

A special class of surfactants, Tri-Siloxanes, helps aqueous surfactants spread on extremely hydrophobic surfaces. The mechanism of the spreading is still not well understood. Several researchers, including our lab at Berkeley, are performing AFM and FTIR studies to develop an understanding of how tri-siloxanes act as super-spreaders. I intend to use this understanding to develop a transport model of the spreading and then obtain the optimum conditions (such as surfactant concentration) to maximize this spreading. It is well known that increasing the surfactant concentration initially increases spreading rates. However, beyond a critical concentration, further surfactant addition actually retards spreading. We believe that Marangoni flows along with local pressure gradients are driving the spreading. Marangoni forces become smaller at very high concentrations; this might explain the reduction in spreading rates beyond a critical concentration. Predicting this critical cut-off is extremely important in industrial applications, for it would allow one to maximize the spreading rates while minimizing surfactant consumption. It is also interesting to note that the time scales of adsorption of these surfactants to the solid interface are much slower than the spreading time scales. This raises the question of how could the surfactants drive spreading if they cannot adsorb at the solid interface. One potential resolution to this paradox could be the tank treading motion of the air-liquid interface through which the surfactant adsorbs at the air-liquid interface and is subsequently brought to the solid-liquid interface via the tank treading motion. Our study will also investigate if this hypothesis is indeed valid. Another fundamental aspect of this research is to obtain the appropriate slip condition to eliminate the stress singularity at the liquid-liquid-air contact line (22). Currently, the most commonly used slip law is the linear relationship between the slip velocity and the wall shear stress. We wish to use molecular simulations to obtain an appropriate slip condition at the solid-liquid interface and to use this as the boundary condition in the continuum model. Another variant of this project that I would like to study is surfactant driven spreading on thin liquid substrates and spreading of aqueous surfactant drops on liquid substrates with dissolution of the surfactant into the substrate.

POSSIBLE FUNDING SOURCES: NSF, Companies such as Dow Corning, Du Pont

JETS AND DROPS

It is well known that a linear stability analysis predicts that a single jet becomes absolutely unstable below a critical Weber number or non-dimensional velocity (23). However, experiments designed to observe the absolute instability have not been very successful. In my graduate research, I was able to see the backward propagation of disturbances at very low Weber numbers with wavelengths that correspond to the predicted wavelengths of absolutely unstable waves, but these disturbances do not appear to grow in time. (24) This could be because these disturbances are non-linearly stabilized. A non-linear stability analysis or a boundary integral calculation for finite length jets could prove whether the above conjecture is true. Another aim of the study would be to calculate the pressure and the velocity profiles in the jet as it crosses into the absolute instability domain. This would lead to a physical understanding of the forces that lead to this transition from the spatial instability (growth only in space, but not locally in time) to absolute stability (growth in space and also in time).

Liquid flowing through an orifice emerges as discreet drops at low Weber numbers and as a jet at high Weber numbers. At very low Weber numbers, the drop shape are a series of quasi-static Young Laplace shapes of increasing volumes; on increasing the Weber number the drop shapes start to deviate from the (equilibrium) Young-Laplace shapes. The aim of this project is to study these drop shapes using the Inviscid Boundary Integral method and to observe the transition from Young Laplace drop shapes to elongated, jet-like shapes. Some researchers hypothesize that this transition is the same as the absolute instability that arises in jets below a critical Weber number (25). This study will seek to investigate whether this hypothesis can be substantiated or whether these are indeed different phenomena. While the transition of drops to jets on increasing Weber number is well understood, the physics behind the transition from the jets to dripping on reducing the Weber number is not clear. One possibility is that this is simply the capillary breakup of the jet due to spatially growing waves whose growth rates increase on reducing the Weber number. Once the spatial growth rates are so large that the breakup length of the jet is of the order of the jet diameter, the orifice begins to drip. We will do experiments to verify the validity of this hypothesis. This transition could potentially also be due to the absolutely unstable waves that grow in time below a critical Weber number. However, this hypothesis would lead to the conclusion that the transition from jets to drops takes place at the critical Weber number, which is not borne out by experiments conducted by me during my graduate research. It is important to know if the Weber number for the transitions from drops to a jet and from jets to drop is above or below the critical Weber number corresponding to the absolute instability. If they are above, then it implies that absolute instability arises at Weber numbers at which the jet does not yet exist.

POSSIBLE FUNDING SOURCES: Government agencies such as NASA, NSF.

STABILITY ANALYSIS OF A JET EXTRUDING INTO A FLUID RESERVOIR

The extrusion of jets into an infinite liquid phase is a very important commercial process in fiber spinning and melts extrusion (26). Processing rates in these operations are limited by flow transitions, which are a result of elastic instabilities. These instabilities can result in severe distortion of the extrudate. While a number of linear stability calculations have been performed for simpler flows of elastic fluids such as stagnation flow (27), viscometric flows (28), no analysis has been done for viscoelastic jets. In fact, the origins of the purely elastic instabilities in extruding jets are still in dispute. We wish to do a spatial stability analysis of this system in order to understand the origin of the instabilities and ways to predict and if possible suppress them. The most difficult part of such an analysis is to determine the base state, i.e., the unperturbed flow that satisfies the governing equations and boundary conditions exactly, of the system. This stability problem has not been solved even for the Newtonian fluids. The base state initially obtained by Squire and independently by Landau, is a spatially and temporally growing boundary layer (29). This problem is sometimes confused with the Tomotika's problem in which both the jet fluid and the surrounding infinite fluid are stationary or, equivalently, moving in plug flow at the same speed. Another important variation of this problem is to perform a spatial stability analysis of a jet extruding into air at a different temperature than the fluid. This would set up axial temperature gradients and would drive Marangoni flows. It would be interesting to determine the effect of the Marangoni flows on the stability characteristics of the jet.

POSSIBLE FUNDING SOURCES: Government agencies such as NASA, NSF.

(3) INTERFACIAL PHENOMENA AND SURFACTANCY

MEASUREMENT OF KINETIC CONSTANTS FOR SURFACTANT ADSORPTION ON AIR-LIQUID INTERFACE

The kinetic constants and diffusion coefficient for a monomer are obtained by creating a fresh pendant bubble in the aqueous surfactant solution, measuring the dynamic surface tension (30). These kinetic constants are of importance in a variety of applications such as spreading, foaming, emulsification. The surface concentration of the surfactant can be calculated by solving the diffusion equation. The surface concentration can be related to the surface tension by the equation of state. The kinetic constants and the diffusion coefficient can then be obtained by best fitting the calculated values to the experimental data. But in cases when the diffusive time scales are much slower than the kinetic time scales, this method cannot provide the kinetic constants. Another experimental setup in which the convection dominates diffusion can be effectively used in such situations to calculate the kinetic constants. If convection is large, there is a diffusion boundary layer next to the interface and in the limit of the Peclet number going to infinity, the boundary layer thickness will approach zero and sublayer concentration approaches the bulk concentration. Such a setup has two main requirements: Creation of a clean interface at very short time scales and continuos mixing in the bulk. A cylindrical container can be filled with pure water with a Wilhelmy plate at the interface to measure the tension. This container has multiple radial inlets at the periphery. At t=0, a concentrated surfactant solution is flown into the system through these inlets. The jets of the concentrated solution cause a lot of mixing at very fast time. This creates a well-mixed bulk and a clean interface. Subsequently, the system could either be kept well mixed by magnetic stirrers or re-circulation of the solution through the radial inlets. The surface tension is continuously monitored through the Wilhelmy plate and the best fit of the surface tension data to the model calculation, which assumes uniform bulk concentration, will yield the kinetic constants.

TEACHING INTERESTS

I have had an extensive teaching experience during my graduate studies at the City College of New York. I was the instructor for two freshman design courses, ENGR 101 and ENGR102 and a teaching assistant for a transport course, TRANSPORT I - Fluid Mechanics. I taught each of the two design courses for 5 semesters. ENGR 101 and 102 courses were designed as design courses for incoming freshman students from all the departments to inculcate a concept of design at a very early stage. These courses formed the core of the program developed by the ECSEL (Engineering Coalition of Schools for Excellence and Leadership) for the City College of New York. I was also involved in designing these courses and developing the manuals and the design problems used in these courses. ENGR 101 is used to teach some basic concepts of robotics and structural design. The design problems include developing software to control a robot arm and a bridge design using a commercially available package. ENGR 102 is designed to teach basic concepts of chemical and electrical engineering. I developed a heat transfer module and later was involved in developing a distillation module for this course.

I enjoyed my teaching experience at City College very much. It was certainly a very rewarding experience. Professor Peter Ganatos and Professor Ben Liaw were the coordinators of the ECSEL program at the City College and I always received very positive feedback about my teaching from the external evaluation and also from the student evaluation.

While I certainly enjoyed teaching the design courses and the transport course, I do not want to restrict myself to teaching only these courses. I would like to teach any of the chemical engineering courses and would also love to teach courses related to some other fields such as physics (statistical physics), mathematics (complex variables) and biochemistry.

REFERENCES

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Attachment B

Drug Delivery through contact lens

Degree Level: Doctorate
Funding agency: Start Up funding

Currently most of the eye drugs are applied topically in the form of drops. This results in a very high concentration of the drug in the tears for a short time. Most of the drug drains with the tears through the puncta into the nasal cavity where it is absorbed. Thus the drug is wasted and in some instances absorption of the drug in the nose leads to side effects.

This project is aimed at developing contact lenses to serve as drug delivery vehicles. Contact lenses are hydrogels, i.e., a crosslinked network of polymer fibers with water content varying from about 30-80%. This project seeks to encapsulate the drug in nano-particles and disperse these particles in the hydrogel matrix. The drug will diffuse out of the particles and through the lens and enter the tear fluid. This will result in a low drug concentration in the tears for an extended period of time.

The project will entail encapsulating the drug in the nano-particles and studying the release rates of the drug through the particles. Next the particles will be dispersed in the hydrogel lens and the release rates through the hydrogel matrix would be measured. The project will also involve modeling the drug release from the particles and its subsequent transport through the hydrogel matrix.

Surfactant driven spreading on hydrophobic surfaces

Degree Level: Doctorate
Funding agency: Start Up funding

In a number of applications it is desirable to spread aqueous solutions on hydrophobic surfaces. There is a class of trisiloxane surfactants called 'super-spreaders' that in sufficiently high concentrations drive spreading on hydrophobic surfaces. While these surfactants have been used for a while, the mechanism of spreading is still not clearly understood.

The aims of this project are to use experiments and modeling to determine the mechanism of the surfactant driven spreading. The experimental component of the project will involve using ellipsometry and AFM to measure surfactant concentration profiles on the solid-liquid interface during or after the spreading of a surfactant-laden drop. In addition, spreading studies will be undertaken on different kinds of substrates and substrates covered with a layer of the super-spreaders deposited either through adsorption from bulk fluid followed by drying or as Langmuir-Blogett films.

The theoretical component will involve modeling the mass transfer and the fluid mechanics to predict the spreading rates. It is well known that increasing the surfactant concentration initially increases spreading rates. However, beyond a critical concentration, further surfactant addition actually retards spreading. We believe that Marangoni flows along with local pressure gradients are driving the spreading. Marangoni forces become smaller at very

high concentrations; this might explain the reduction in spreading rates beyond a critical concentration. Predicting this critical cut-off is extremely important in industrial applications, for it would allow one to maximize the spreading rates while minimizing surfactant consumption. It is also interesting to note that the time scales of adsorption of these surfactants to the solid interface are much slower than the spreading time scales. This raises the question of how could the surfactants drive spreading if they cannot adsorb at the solid interface. One potential resolution to this paradox could be the tank treading motion of the air-liquid interface through which the surfactant adsorbs at the air-liquid interface and is subsequently brought to the solid-liquid interface via the tank treading motion. This study will also investigate if this hypothesis is indeed valid. Another variant of this project is to study surfactant driven spreading on thin liquid substrates and spreading of aqueous surfactant drops on liquid substrates with dissolution of the surfactant into the substrate.

Dynamic surfactant adsorption above critical micelle concentration

Degree Level: Doctorate
Funding agency: Start Up funding

Adsorption of surfactants on air-liquid and solid-liquid interfaces have applications in wide ranging processes such as spreading, emulsification and foam stabilization. In most of the applications, the surfactant concentration in the bulk is above the critical micelle concentration, i.e., there are surfactant aggregates in the bulk in addition to the monomers. The aim of this project is to model the breakup of micelles and the adsorption of the surfactant on various interfaces. The model will be based on solving continuum mass transfer equations along with the appropriate adsorption dynamics on the surface. The model would also incorporate the micelle breakup dynamics. An interesting extension of the project could be to compare the continuum predictions with Monte-Carlo simulations or perhaps to use the simulations to provide the kinetic constants for the continuum calculations.

The model predictions would be compared with experimental measurements of adsorption dynamics on air-liquid and solid liquid interfaces obtained by using ellipsometry and pendant drop setup.

Hydrodynamic stability of jets

Degree Level: Doctorate
Funding agency: Start Up funding

This project is aimed at studying hydrodynamic stability of jets extruded into a liquid reservoir. The study is relevant in the process of extrusion, which is a commonly used manufacturing technique. The project would also involve studying the transition of drops to jets and the transition from convective to absolute instability in a jet. Convective instability implies that any disturbances introduced to the jet grow spatially and absolute instability implies that the disturbances also grow in time. Of particular interest is the relevance of absolute instability in drop formation and the behavior of the absolutely unstable waves in non-linear regime to determine if there is any non-linear stabilization. This analysis would lead credence to our speculation that absolutely unstable waves in a jet are non-linearly stabilized and thus they do not cause jet breakup into drops. The theoretical analysis would be based on finite element

modeling of the system. In addition experiments would be conducted using a fast video camera to study the transition to absolute instability.

Determine surfactant equation of state for soluble surfactants by using an oscillating pendant drop

Degree Level: Masters
Funding agency: Start Up funding

Surfactant equation of state relates the surface tension of an interface to the surface concentration of the surfactant. For a soluble surfactant it is difficult to measure the amount of surfactant present on the surface. Thus, it is not easy to determine the equation of state for a soluble surfactant. This project aims to use an oscillating pendant bubble/drop to measure the surface tension and the elasticity of an interface. The main idea in this project is to develop a way to calculate the surface concentration from the elasticity data and thus determining the equation of state.

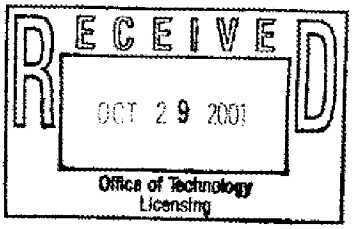
Interaction between soft contact lens and mucin covered solid surface

Degree Level: Masters
Funding agency: Start Up funding

Once a contact lens is inserted in the eye, the eyelid forces cause deformation and settling of the lens. Eventually, sections of the lens come in contact with the mucin covered corneal surface. This project is aimed at measuring the interaction between a soft contact lens and a solid surface covered with mucin. If the lens and the mucin covered surface are left in contact with each other and if there is some normal force acting on the lens during this time, adhesive bonds will form between the two surfaces. The adhesive force depends on the amount of time that the surfaces are left in contact and also on the normal force applied on the lens during this contact. So, the project would involve measuring the shearing force required to break the adhesive bonds and cause relative motion for various normal forces and times of contact. This project will provide valuable insight into the factors that lead to corneal abrasions and lenses sticking during extended lens wear.

Attachment C

UF # 10721



CONFIDENTIAL
INVENTION DISCLOSURE

1. Disclosure of Invention

An invention includes any discovery, new and useful process, composition of matter, article of manufacture, know-how, design, model, technological development, biological material, strain, variety, culture of any organism, or portion, modification translation, or extension of these items, and any mark used in connection with these items. Under patent law, this may include drugs, newly discovered, mutated or genetically engineered microorganisms or plants, new or altered forms of plant life, vaccines, cells, tissue and organ cultures, products of recombinant DNA research, hybrid cell cultures, processes involving microorganisms, monoclonal and polyclonal antibodies, engineered proteins, and some computer programs and designs.

A. TITLE: A Novel Ophthalmic Drug Delivery Vehicle: Dispersion of Nanoparticles in Soft Contact Lens
(Brief, but comprehensive, technically accurate, and descriptive)

B. CONCISE DESCRIPTION OF THE INVENTION

1. The disclosure should enable someone having knowledge of the field to understand the invention. Include essential elements (features, concepts, or new results of the invention, whichever is most applicable), their relationship to one another, and their mode of operation. Identify the elements that are considered novel.

All of the currently existing ophthalmic drug delivery vehicles deliver only about 5-10% of the active drug to the cornea. The rest of the drug is lost due to tear drainage. A fraction of this drug gets absorbed in the nasal cavity and enters the blood stream, where it could have undesirable side effects. To reduce drug loss, eliminate systemic side effects, and improve drug efficacy, we propose to develop disposable soft contact lenses as a new vehicle for ophthalmic drug delivery.

The essential concept is to encapsulate the ophthalmic drug formulations in nanoparticles and to disperse these drug-laden particles in the lens (Figure 1). If the nanoparticle size and loading are less than about 50 nm and 5%, respectively, the particle-loaded lens is transparent. In this project we focus on soft hydrogel lenses that are made of poly 2- hydroxyethyl methacrylate (HEMA). The poly-HEMA hydrogel matrix is synthesized by bulk or solution free radical polymerization of HEMA monomers in presence of a cross linker such as Ethylene glycol di-methacrylate (EGDMA). Addition of drug-laden particles in the polymerizing medium results in the formation of a particle-dispersion in the hydrogel matrix. If contact lenses made of this material are placed on the eye, the drug diffuses from the particles, travels through the lens matrix, and enters the post-lens tear film (POLTF), i.e., the thin tear film trapped in between the cornea and the lens. In the presence of a lens, drug molecules have a residence time of

about 30 minutes in the post-lens tear film, compared to about 2 minutes in the case of topical application as drops. The longer residence time results in higher drug flux through the cornea and reduces the drug inflow into the nasolacrymal sac, thus preventing drug absorption into the blood stream. In addition, due to the slow diffusion of the drug molecules through the particles and the lens matrix, drug-laden contact lenses can provide continuous drug release for extended periods of time. We note that the drug-laden lenses need to be stored in a thin pouch containing a saturated drug solution to prevent drug loss before the lens is placed on the eye. The idea of dispersing drug-laden nanoparticles has never been studied before.

2. If the invention is an apparatus or system, attach drawings or a sketch and indicate if it has ever been built or tested. Use additional pages, attach drawings, manuscripts, papers, or other supporting material to facilitate understanding the invention. Attach any data which shows that the invention works.

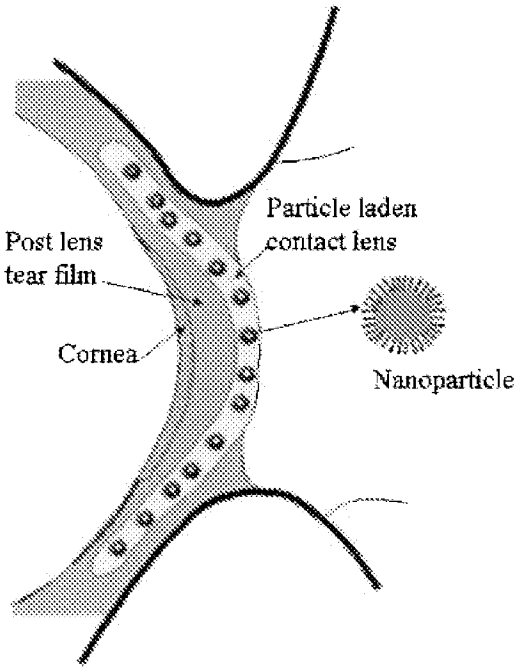


Figure 1 Schematic of the novel particle laden lens inserted in the eye

Currently, we have developed hydrogel lens materials that contain nanoparticles laden with hydrophobic drugs and we have studied the release rates of the drug diffusing out of the particles and out of the hydrogel material into a well-stirred tank. This proves that our concept is indeed feasible. Our drug delivery system can be used to deliver any kind of drug to the cornea. This concept can also

be used to develop skin patches and ophthalmic inserts for drug delivery. For the purpose of 'proof of concept' we used microemulsion drops laden with lidocaine to synthesize the particle laden lens material. Now we are incorporating other particles such as liposomes, silica particles, PECL nanospheres in our lens material. We will also add other drugs to the particles, especially, ophthalmic drugs such as Timolol, Ciproflaxin and Cyclosporin A.

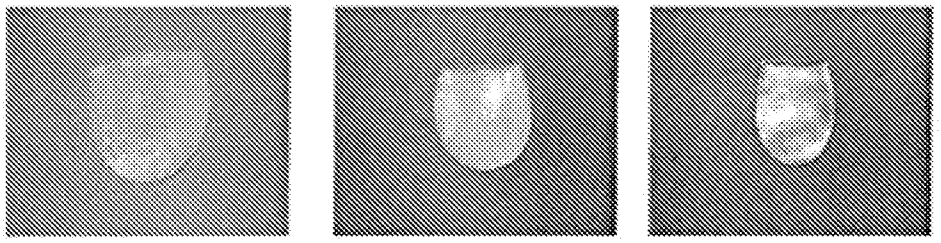
We investigated three kinds of microemulsions for entrapping the drug:

1- Microemulsion of canola oil in water using Tween 80 and Panodan SDK surfactants with a mean size of 40nm (Type 1)

2- Microemulsion of hexadecane in water using Brij 97 as surfactant with a mean size of 10 nm (Type 2)

3- Microemulsion of hexadecane in water using Brij 97 as surfactant with a silica core around the microemulsion drops (Type 3)

All the three types are food grade microemulsions, therefore are appropriate for contact lens applications. Pictures of hydrogels laden with the three different microemulsion drops are shown below.



(a) (b) (c)

Figure-2 Picture of hydrogels synthesized with three different microemulsions: **(a)** Hydrogel with microemulsion of canola oil in water, **(b)** Hydrogel with microemulsion of hexadecane in water, **(c)** Hydrogel with microemulsion of hexadecane in water stabilized with OTMS. Hydrogels in (a) and (b) are partially opaque and (c) is transparent.

After synthesizing the drug-loaded hydrogels we measure the rates of drug release from the hydrogel matrix. Initial drug diffusion measurements are performed with a drug named lidocaine hydrochloride. Lidocaine is an antiarrhythmic drug commonly used to restore a regular heartbeat in patients with arrhythmia. We are using Lidocaine in early stages of the experimentation since it is cheap

and available in chemical companies without prescription. Lidocaine hydrochloride ($C_{14}H_{22}N_2O \cdot HCl$) is a water-soluble drug that can be converted to an oil soluble form by reacting it with a base such as sodium hydroxide so it can be used as both a hydrophilic and a hydrophobic drug.

The drug release experiment consists of suspending the drug loaded hydrogel in a well stirred beaker containing a known volume of water. Aliquots of water are withdrawn at various times and concentration of the drug is measured. We also prepared hydrogels that do not contain any drug and use these as references in the measurements. We used UV-Vis spectroscopy to determine the drug concentration with respect to time.

We prepared hydrogels loaded with Type-2 microemulsion that contains 0.03M of oil soluble form of lidocaine and inserted them into water. We measured the absorbance value of the water solution for three days with varying time intervals. The absorbance values are related to the concentration with the help of the calibration curves to find how much of the amount that is initially introduced into the hydrogel diffused into the solution. Table-1 gives concentration of the drug in the solution and percentage of the drug diffused into the solution over time. It can be seen from the table that about 17% of the drug that was initially put into the hydrogel diffused into the water solution. This experiment proves that we can successfully trap hydrophobic drugs in hydrogel matrix and subsequently, release it into bulk liquid. If a contact lens made of such a material is placed on the eye, it will deliver ophthalmic levels of drug to the tear film for extended period of time. We note that the release rates in our experiments are about comparable to the desired release rates. Furthermore, we can trap more drug in the matrix by increasing the drug concentration in the oil. Thus our device can deliver ophthalmic drugs for about 5-10 days.

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C. **PRACTICAL FEATURES**: In lay terms, please describe the practical features of the invention.

The invention is a controlled and extended drug delivery vehicle for ophthalmic applications. It can be used to simultaneously correct vision and deliver drugs of any kind. In addition, this invention can supply antibiotics in low dosages to prevent bacterial infection in the eyes, which is one of the biggest problems associated with extended wear soft contact lenses. This invention can also deliver viscous liquids to the tear film that will slow down the tear drainage potentially treating the dry eye problems that afflict millions of Americans.

D. **PRODUCTS:** Describe the most likely products, services or commercial processes or other applications that could result from this invention (especially important if the invention is a chemical compound).

(1) Disposable contact lenses that deliver drugs to the eye

(2) Contact lenses laden with antimicrobial agents to facilitate extended wear.

(3) Contact lenses that provide a viscous liquid to the tear film slowing down the tear drainage to reduce the dry eye syndrome.

E. **BENEFITS**: Describe the primary benefits to a potential customer or user for any products, services, or commercial processes that might be developed from this technology (*e.g.*, what could it do to help a potential customer: lower expenses, increase productivity, efficiency or accuracy, minimize risk, simplify a process, overcome a defect, increase revenue, promote safety?).

Approximately 90% of all ophthalmic drug formulations are now applied as eye-drops. While eye-drops are convenient and well accepted by patients, a majority of the drug contained in the drops is lost due to tear drainage. The drops mix with the tear fluid, and subsequently, about 95% of the drug flows through the upper and the lower canaliculi. Eventually, a major portion of the drug is absorbed in the nasolacrymal duct and enters the blood stream. This can lead to serious side effects. For instance, absorption of Timolol, a beta-blocker used to treat glaucoma, has harmful effects on the heart. Furthermore, topical ophthalmic drug delivery results in a relatively high drug concentration in the tear film followed by a rapid decline. This results in sharp variations in the drug delivery rates to the cornea, reducing the efficacy of ophthalmic drugs. Our invention will solve all the above-mentioned problems and in addition also improve patient compliance because once inserted, the drug-laden lens will provide drug supply for a period extending from 1 – 10 days.

F. **What is the stage of development?**

____ Working prototype
__x__ Proof of concept

____ Analytical work

What work remains to complete development?

We need to incorporate other ophthalmic drugs into the lens material. The next stage will involve fabricating lenses out of this material by lathe cutting and testing the efficacy and safety of these lenses in animal models.

2. Market Information

Please provide this information to the best of your knowledge. We realize this information may not be readily known, but your input will be helpful.

A. Market Need

1. What is the ideal market for this technology? Who needs it?

Almost everyone who needs to apply ophthalmic drugs and all those who wear soft contact lenses.

2. Why do you think the market needs this technology?

Because of the benefits detailed above.

B. Market Demand

1. What factors influence demand in the market?

2. Is demand becoming weaker or stronger?

Stronger

C. Market Size

1. What is the estimated size of the market in annual dollars? $ _____

2. How did you derive this figure? Please attach any supporting data.

D. Market Research Information

1. Please list any published technical material such as patents, commercial literature, or scientific articles relating to the invention and any planned future publications.

None

2. Have you conducted any market research? If so, please list your sources.

No

E. Competing Products

1. What existing commercial products or services would this invention directly displace?

None

2. What are the competing alternatives or substitutes?

There are other ophthalmic drug delivery vehicles based on polymeric gels, liposomes, bio-inserts, etc., that can compete with our invention.

F. New Developments and Circumvention

1. Are you aware of any new developments (*e.g.*, technologies, products) by others to accomplish the same objective?

No

2. How would you "get around" your own invention?

If we patent the idea of incorporating nanoparticles in hydrogels, it will be very difficult to get around this invention. However, if we only patent the synthesis procedure and the specific kinds of drugs, gels and particles, one can get around this invention simply by using slightly different kinds of materials.

G. Suppliers

1. What companies are the major suppliers for products or services that could or will compete with the invention?

This is a completely new produce. There are other ophthalmic drug delivery vehicles in the market such as a product by Alza and those could compete with our invention.

2. Are there many suppliers or is the market dominated by few companies?

No

3. Would any of these suppliers be potential licensees?

ossibly yes. Companies such as Bausch and Lomb might be interested in this technology.

H. Competitive Advantages

1. In comparison to currently existing products, services or processes, describe how the subject invention will provide or contribute to superior advantages or benefits.

Please see E above.

I. Regulatory Issues

1. What are the regulatory or other entry barriers or impediments to the market?

The tests to approve the novel product will need to be FDA approved.

3. Potential Licensees/Partners

A. If you are aware of a ***definitive*** licensee or a research sponsor who will license this invention, we must know immediately. Please indicate that company (with specific individual and phone number) in the space below:

No

B. Where would this invention have the most commercial value? Please indicate your evaluation by ranking the following geographic areas (1 being the highest).

United States	1	Japan	3
Europe	2	Other (Please specify)	All countries

C. 1. Have you communicated with any industry representative regarding your invention?
YES _____ NO __x_____ If yes, please provide the following information:

Date of Disclosure _____
Company _____
Address _____
City/State/Zip _____
Telephone Number _____
Individual Contact _____
Official Title _____

2. Was such a disclosure made under a confidentiality agreement? YES _____ NO _____

3. If yes to C.2, please provide a copy of that agreement.

D. Do you wish to license this invention for your own company? YES _____ NO _x_____

Do you wish to discuss this possibility with OTL?

E. Do you wish to continue research on this invention if the entity licensing the invention provides funding? YES __x____ NO _____

4. Public Disclosure/Publication Plans

Public disclosure includes abstracts and presentations at scientific meetings (including poster sessions), public seminars, shelving of theses, publications, disclosure to others outside of the University who have not signed a confidentiality agreement, and the use, sale, or offer of sale of the invention. Identify dates and circumstances of any such disclosures. Also, indicate your future disclosure or publication plans, and NOTIFY the Office of Technology Licensing (address given in section 9) if the invention becomes publicly disclosed or published in the future (whether by plan or inadvertently).

A. Which of the following have you done or do you intend to do?

		YES	NO	DATE
1.	Publish	x		2002
2.	Oral Presentation	x		2002
3.	Poster Session	x		2002
4.	Disclose to Industry Rep.	x		2002
5.	Other Public Dissemination			

5. Financial Support/Contract Identification

The primary purpose of this section is to identify any specific grant or contract number(s) (not the account number) and the external sponsors (governmental agencies, industrial sponsors, private agencies, or others) which provided support used to defray costs related to the research from which the invention resulted. This information is needed to determine whether this invention is subject to any commitments or restrictions arising from the terms of sponsorship. **(NOTE: The percentages indicated in B through E below must add up to 100%.)**

A. Name and address of the University facility, including any Agricultural Research and Development Center, where the invention was developed:

Name	ChE Bldg
Address	University of Florida
City, State, Zip	Gainesville, FL 32611

B. Please provide the following information regarding any contract and grant support of the invention process. (The following information must be provided for EACH contract or grant that supported the invention process; attach additional sheets if necessary.)

Name	
Grant/Contract #	
Address	
City, State, Zip	
P.I. Name	
Grant/Contract Title	

What is the estimated the percentage of contribution through this contract/grant? _____%

C. Please provide the following information regarding any support for the invention process by the Florida Agricultural Experiment Station (FAES):

1. List Experiment Station (CRIS) Projects by number and title in effect during the research and development process:

USDA/CSRESS/FLA _____

2. What is the estimated percentage of contribution through the FAES? _____%

D. What is the University's estimated percentage of other support beyond any contracts, grants and/or support by FAES to the invention process? Support includes facilities, personnel, (including yourself) and supplies as well as money in the form of department, University, or gift funds. _____100_____%

E. What is the estimated percentage of other support? __0_____%
Please explain the circumstances of this support. (An example would be a co-contributor's independent funding from his or her institution.)

F. Did any of the contributors use any instrument(s) biological, chemical or physical material(s) or substance(s) obtained from others to create this invention? YES _____ NO __x_____

If YES, did a Materials Transfer Agreement or other document accompany the transfer?
YES _____ NO _____ Please list any such agreements.

G. Did you or any of the co-contributors submit any University of Florida Disclosure of Outside Activities and Financial Interests, Reporting July 19__ - June 19__, Form # OAA-GA-L267-Rev. 3/98 for this year or the previous academic year?
YES _____ NO ____x_

(If YES, please provide copies of the approved University of Florida Disclosure of Outside Activities and Financial Interests, Form # OAA-GA-L267-Rev. 3/98, with this invention disclosure form.)

6. Identification of Contributor(s)

List below all persons who are believed to have contributed to the conception or reduction to practice of this invention. Please provide addresses and phone numbers where they may be contacted. Please make additional copies of this page if necessary.

Researcher # 1

Anuj		Chauhan
First Name	Middle Name	Last Name
ChE Bldg, PO 116005		2600 SW Williston Rd #1204
Work Address		Home Address
Gainesville, FL 32611		Gainesville, FL 32608
City, State, Zip, Country		City, State, Zip, Country
352-392-2592		352-335-7589
Work Phone Number		Home Phone Number
352-392-9513		chauhan@che.ufl.edu
Work Fax Number		e-mail Address
06582+444		India
Social Security Number		Citizenship

Assistant Professor, Chemical Engineering
Researcher title and University affiliation, *e.g.*, Department, Center, College

Researcher # 2

First Name	Middle Name	Last Name
Work Address		Home Address
City, State, Zip, Country		City, State, Zip, Country
Work Phone Number		Home Phone Number
Work Fax Number		e-mail Address
Social Security Number		Citizenship

Researcher title and University affiliation, *e.g.*, Department, Center, College

Note: The foregoing list should include names of all persons who may qualify as legal inventors. Inventorship is a legal question, which is generally determined by the attorney of record at the time a patent application is filed. A statement, which discusses the concept of inventorship, is available from the Office of Technology Licensing.

7. Signatures

Signature of researcher submitting disclosure:

Anuj Chauhan
Name

Achauhan
Signature

10/23/2001
Date

8. Distribution

Send the original and one copy of the completed disclosure to the Office of Technology Licensing, 308 Walker Hall, P.O. Box 115500, Gainesville, FL 32611, Telephone: (352) 392-8929.